Developing Student Engagement Opportunities in Higher Education

Lynne Orr
Walden University, USA

Nancy Weiner
David and Lorraine Cheng Library, William Paterson University of New Jersey, USA

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Chapter 13
Guiding Research, Building Belonging:
Librarians' Role in Honors Undergraduate Research

Amber Pierdinock-Weed
https://orcid.org/0000-0001-9016-4276
University of Maryland, College Park, USA

Rachel W. Gammons
https://orcid.org/0000-0001-7412-8574
University of Maryland, College Park, USA

Lindsay Inge Carpenter
University of Maryland, College Park, USA

ABSTRACT

Participation in high-impact educational practices (HIPs) such as living-learning programs (LLPs) and undergraduate research are continually cited as strong indicators of student engagement in higher education. The current literature shows students participating in HIPs exhibit a stronger sense of belonging on their campus. While academic libraries have regularly provided support to HIPs in higher education, much of the literature has focused on academic libraries as institutional support, instead of academic librarians as individual support. This case study of an undergraduate research-focused LLP at the University of Maryland, College Park investigated how mentorship from academic librarians is positively contributing to students' sense of belonging on campus.

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INTRODUCTION

High-impact educational practices (HIPs) have been widely recognized for their role in improving student engagement, persistence, and success (Kuh, 2008; Brownell & Swaner, 2009). Among these practices, living-learning programs (LLPs) provide immersive academic and social experiences that help students transition to college, develop intellectual curiosity, and build lasting connections within their institutions (Inkelas & Soldner, 2011). While HIPs emphasize faculty and peer collaboration, less attention has been given to the role of academic librarians as mentors within these frameworks. This gap is particularly evident in undergraduate research, where students often struggle with navigating scholarly information, synthesizing knowledge, and developing research self-efficacy.

This chapter explores the intersection of HIPs, librarian mentorship, and student engagement through a case study of the Gemstone Honors Program at the University of Maryland (UMD). Gemstone is a four-year LLP that embeds students in team-based research projects, providing an ideal setting to examine how librarian mentorship shapes students' academic experiences. Drawing on ten years of qualitative data from student applications to the University Libraries Award for Outstanding Gemstone Team, this study investigates how librarian mentorship contributes to student research engagement, sense of belonging, and academic success.

By examining the partnership between Gemstone and UMD Libraries, this chapter offers a replicable model for embedding librarians in undergraduate research initiatives. It highlights the transformative role of librarian mentorship in fostering student success and provides insights into how academic libraries can deepen their engagement with high-impact learning environments.

LITERATURE REVIEW

The literature on high-impact practices (HIPs) and student engagement demonstrates the importance of structured academic experience in fostering student persistence, intellectual development, and sense of belonging. HIPs, particularly those that emphasize collaboration, undergraduate learning, and co-curricular engagement have been shown to positively affect student outcomes. Living Learning Programs (LLPs) combine multiple HIPs to integrate residential and academic experiences to enhance students' transition to college and academic success. Additionally, academic libraries play a fundamental role in supporting student learning, yet research on their contribution to HIPs - particularly in undergraduate research - remains limited. This literature review offers a brief synthesis of existing research on HIPs, LLPs, and the

role of academic libraries in student engagement, setting the stage for examining librarian mentorship in the Gemstone Honors Program at UMD.

High-Impact Practices

High-impact practices (HIPs) in higher education are evidence-based approaches to teaching and learning that enhance undergraduate student engagement, retention, persistence, and academic success. Kuh (2008) identifies 12 HIPs as active learning practices that promote deep learning, including (a) first-year experiences, (b) common intellectual experiences, (c) learning communities, (d) writing-intensive courses, (e) collaborative assignments and projects, (f) undergraduate research, (g) diversity/global learning, (h) service learning, (i) community-based learning, (j) internships, (k) capstone courses and projects, and (i) e-portfolios. While these practices are "mobilized" differently across institutions, common characteristics emerge, including an emphasis on written expression, collaborative and peer-based learning, and co-curricular experiences (Lange & Stewart, 2019, p. 223). HIPs are particularly effective in the first and second year of undergraduate education by supporting students in their transition into college, fostering the development of professional and academic identities, and cultivating a sense of belonging within the university (Brownell & Swaner, 2009).

HIPs have long-term benefits that extend throughout undergraduate education. Longitudinal research suggests that students who participate in multiple HIPs experience were more likely to complete college within six years compared to uninvolved peers (McDaniel & Van Jura, 2020). Furthermore, HIPs reinforce equity in student success, as their positive impacts are particularly pronounced for students from historically underrepresented and marginalized backgrounds, including first-generation college students, transfer, low-income, and Students of Color (Finley & McNair, 2013). However, not all HIPs are equally accessible to all students - some, such as internships, study abroad, and undergraduate research, may require additional financial, social, or academic capital to obtain (Lange & Stewart, 2019). In addition, the defining characteristics of HIPs, including high performance expectations, faculty peer interaction, integration with diverse people and ideas, and interactive learning, may have differential impacts for students from underserved populations (Zilvinskis, 2019). Institutions seeking to expand HIPs must consider structural barriers to success and work toward inclusive implementation strategies that offer equal opportunities to all students.

Living Learning Programs

For residential colleges and universities, Living-Learning Programs (LLPs) are a prominent example of an HIP that integrates students' academic and residential experiences. LLPs foster a sense of community, encourage deeper intellectual engagement, and enhance students' sense of belonging, which, in turn, can lead to increased retention and academic performance (Brower & Inkelas, 2010). These programs operate through various models, including discipline, social identity, or theme-based communities. LLPs have been shown to positively impact faculty and peer interaction, the transition to college, campus life, academic engagement, self-efficacy, and psychosocial development (Inkelas & Soldner, 2011).

Longitudinal research on HIPs indicates that two high-impact practices - active and collaborative learning and undergraduate research - have significant and unique impacts on fourth-year outcomes, measuring academic, cognitive, or personal development gains observed by the end of students' fourth year of undergraduate education (Kilgo et al., 2015). LLPs that combine these practices offer a structured, immersive environment where students can engage deeply in inquiry-based learning and develop intellectual curiosity that extends beyond the classroom.

Academic Libraries, Undergraduate Research, and HIPs

The role of academic libraries in supporting undergraduate student success is well-documented, though much of the literature focuses on resources, spaces, and instructional support rather than sustained engagement in undergraduate research (Murray, 2015). Research highlights library contributions to HIPs in areas such as student employment (Mitola et al., 2018), space assessments (Montgomery, 2019), and innovative academic partnerships, such as embedded instruction in first-year seminars (Ruelle, 2020). Crowe (2015) encourages academic liaison librarians to integrate more deeply into LLPs to enhance student support. However, much of this research continues to frame librarians as facilitators rather than partners or mentors in the research process.

Stamatoplos (2009) argued for a shift in the role of academic librarians from transactional supporters to active mentors in undergraduate research. Traditionally, undergraduate students have engaged in faculty-led research rather than independently designing and executing projects. In student-led research models, students take responsibility for the "conception, design, conduct, and dissemination" of original research, often over multiple semesters rather than a single course (Stamatoplos, 2009, p. 236). While faculty typically serve as research mentors in these models, librarians are often consulted only as-needed rather than being formally integrated into the mentorship process (Paddick & Pirmann, 2020).

Some libraries have expanded their role in undergraduate research initiatives, providing structured programming such as research consultations, co-teaching in research-intensive courses, and sponsoring undergraduate research awards. However, most library engagement with undergraduate research remains consultative, rather than integrated and sustained. Bowers et al. (2020) suggest that when librarians take on sustained mentorship roles, students benefit from deeper research engagement and enhanced information literacy skills, while librarians experience increased professional satisfaction. Despite these potential benefits, few studies focus on the long-term impact of librarian mentorship in undergraduate research.

THEORETICAL FRAMEWORK: SENSE OF BELONGING

A strong *sense of belonging* is widely recognized as a key factor in student success, yet the definition and measurement of this concept remains complex and contested (Dias-Broens et al., 2024). Research consistently demonstrates that students who feel a sense of belonging are more likely to persist in their studies, perform well academically, and experience improved mental health and levels of engagement (e.g., Freeman et al., 2007; Gopalan & Brady, 2020; Pedler et al., 2022). However, the ways in which institutions foster and assess belonging vary considerably, with scholars debating the extent to which belonging is shaped by individual experiences vs. institutional structures (e.g., Johnson et al., 2007; Rainey et al., 2018). This section explores existing research on sense of belonging, with a focus on their relevance to undergraduate research, high-impact practices, and academic libraries.

In their systematic literature review, Dias-Broens et al. (2024) found that scholars most often define a sense of belonging in terms of students' feelings of acceptance, connectedness, support, valuation, respect, inclusion, importance, mattering, and fitting in. To measure this construct, researchers have relied on several validated instruments, with three of the most commonly used being the Perceived Cohesion Scale (PCS), the Psychological Sense of School Membership (PSSM) scale, and the Sense of Belonging Instrument (SOBI). The PCS (Bollen & Hoyle, 1990) assesses an individual's sense of morale and belonging within a group, focusing on both connection and commitment. The PSSM (Goodenow, 1993) evaluates students' perceived acceptance, inclusion, and respect within their educational institution, measuring experiences of being valued and recognized by peers and faculty. With strong reliability across diverse student populations, it remains one of the most widely used tools in educational research. The SOBI (Hagerty & Patusky, 1995) examines an individual's overall psychological sense of belonging, distinguishing between perceived social connection and psychological discomfort due to exclusion. These

instruments have been pivotal in educational research, offering valuable insights into how a sense of belonging shapes student persistence, well-being, and engagement.

In this study, we have adopted Strayhorn's (2012) definition of sense of belonging as: "students' perceived social support on campus, a feeling or sensation of connectedness, the experience of mattering or feeling cared about, accepted, respected, valued by, and important to the group (e.g. campus community) or others on campus (e.g., faculty, peers)" (p. 3). To operationalize those concepts, we consulted the PSSM scale (Goodenow, 1993) and SOBI (Hagerty & Patusky, 1995), which resulted in key themes of acceptance, connectedness, respect, and mattering.

High-Impact Practices (HIPs) reinforce a sense of belonging among undergraduate students by providing structured, interactive, and collaborative learning environments (Kirby & Thomas, 2022; Ribera et al., 2017) and creating opportunities for students to engage meaningfully with peers, university faculty and staff, and institutional resources (Brownell & Swaner, 2009). Research suggests that students who participate in HIPs, such as living-learning programs (LLPs), service-learning projects, and undergraduate research, experience greater academic integration and social support, which contribute to a stronger sense of belonging (Spanierman et al., 2013; Strayhorn, 2012). However, while some studies indicate that these benefits can be particularly pronounced for historically underrepresented students (Finley & McNair, 2013; Kuh, 2008), Lange and Stewart (2019) caution that HIPs can also reflect and perpetuate systemic inequities, including racism and classism, that may limit their effectiveness for minoritized students. As a result, while HIPs, particularly LLPs, have been consistently linked to positive belonging outcomes, these impacts cannot be assumed to be universal or equally distributed. Institutional context, program design, and barriers to access play a role in shaping student experiences, meaning that even well-intended initiatives may inadvertently reinforce pre-existing disparities. Recognizing these complexities is essential for ensuring that HIPs fulfill their promise of fostering inclusion and belonging for all students, rather than privileging those who already possess greater institutional and social capital.

While existing research has examined the role of academic libraries in fostering a sense of belonging, these studies have primarily focused on library spaces, services, and resources, such as collections and study environments (e.g., Gujilde, 2021; Scoulas, 2021; Yazdani, 2024). Similarly, scholarship has explored the relationship between academic libraries and High-Impact Practices (HIPs) (Murray, 2015; Oakleaf, 2010), yet little research has specifically investigated the role of librarians as mentors within these initiatives. In particular, there is a notable gap in understanding how relationships with librarians influence students' sense of belonging within Living-Learning Programs (LLPs), especially those with a strong undergraduate research focus. This exploratory study addresses this gap by examining how students in a research-intensive LLP at a public research university perceive, articulate, and

derive meaning from their relationship with a librarian mentor. By focusing on the interpersonal and academic support librarians provide within the LLP context, this study aims to offer new insights into the ways librarian mentorship intersects with students' broader experiences of belonging. In particular, this research addresses the following question:

- How do team-based essays submitted for an undergraduate library research award characterize the role of the library, its resources, and librarian mentorship around research in a student-led research program?

CASE STUDY: GEMSTONE HONORS PROGRAM

The Gemstone Honors Program at the University of Maryland offers a compelling model of how librarians can transition from transactional research support to sustained mentorship. By embedding librarians in the research process from project inception to dissemination, the program demonstrates how academic libraries can play a meaningful role in undergraduate research to support and extend high-impact educational practices (HIPs).

The University of Maryland (UMD) is the state's flagship university and a leading public research institution. Recognized as a "public ivy" (Pines, 2024), UMD enrolls over 40,000 students across 12 colleges and attracts a highly competitive applicant pool, with recent first-time student applications (2022–2024) indicating a midpoint ACT score of 34 and a midpoint SAT score of 1465 (Office of Institutional Research, Planning, & Assessment, 2025). The institution's diverse community, commitment to research innovation, and strong emphasis on student success positions UMD among the nation's premier public research universities.

UMD Libraries play a central role in this academic ecosystem. A member of the Big Ten Academic Alliance and the Association of Research Libraries, UMD Libraries was awarded the 2020 Association of College and Research Libraries Excellence in Academic Libraries award in recognition of its contributions to student learning and faculty research. While the library system provides robust data management services, scholarly workshops, and specialized research assistance for graduate students and faculty, it also prioritizes undergraduate learning through information literacy instruction, wellness initiatives, and co-curricular programming.

The Gemstone Honors Program integrates multiple HIPs to create a deeply engaged undergraduate research experience. Unique among UMD's 16 residential Living-Learning Programs (LLPs), Gemstone is the only four-year program that places team-based undergraduate research at its core. Students from all majors collaborate on long-term projects at the intersections of science, technology, and

social good, working under the guidance of faculty mentors, program staff, and librarians (Coale et al., 2015).

Previous research on the Gemstone Honors Program suggests that its intensive, multi-year structure fosters a strong sense of connectedness among students, both to their peers and to the broader university community. Studies indicate that this sustained engagement enhances students' academic and social integration, reinforcing the importance of early and continuous participation in high-impact educational practices (Bowers et al., 2020). Additionally, Lee et al. (2022) examine how Gemstone's living-learning program model aligns with Schlossberg's (1989) theory of mattering and marginality, highlighting its role in fostering academic persistence and strengthening students' sense of belonging within the university.

Librarians play a central role in the Gemstone Honors Program, serving as research mentors, consultants, and evaluators. Unlike most undergraduate research experiences, where faculty mentorship is the primary source of guidance, Gemstone librarians embed themselves within research teams, offering sustained support that extends beyond conventional instruction. Their engagement ranges from deep, multi-year mentorship to short-term consultations and research award evaluation, ensuring that students have access to expertise at every stage of their research process.

The Gemstone Library Liaison serves as the primary coordinator between UMD Libraries and the Gemstone Honors Program, ensuring students receive consistent, embedded research support throughout their academic journey. In the first year, the liaison provides foundational research instruction, equipping students with core information literacy skills. As students transition into their second year, the liaison matches research teams with librarian mentors, ensuring alignment between project needs and librarian expertise.

Beyond individual mentorship, the liaison fosters broader engagement between Gemstone and UMD Libraries, organizing key events such as the Gemstone Breakfast, where program staff recognize librarian mentors, and the University Libraries Award for Outstanding Gemstone Team, which highlights exceptional student research. By maintaining strong relationships with both the program and library faculty, the liaison ensures that librarian involvement remains structured, responsive, and impactful.

While the Gemstone Library Liaison provides program-level coordination, Librarian Mentors work directly with student teams, guiding them through key stages of their research process. These mentors—primarily subject liaison librarians from STEM fields, though also from humanities, social sciences, and technical services—help students develop advanced research strategies, refine literature reviews, and prepare their work for dissemination.

Mentors provide ongoing, personalized research support, helping students to navigate issues ranging from data management and copyright to patent research and artificial intelligence ethics. Unlike faculty advisors, who focus on disciplinary

content, librarian mentors guide students in developing strong research practices and critical inquiry skills. As students progress through the program, librarian mentors continue to offer support, particularly as teams prepare for publication, conference presentations, and thesis defenses.

For librarians who do not have the capacity for multi-year mentorship, Gemstone provides additional opportunities for engagement. Some librarians contribute through specialized consultations, offering expertise in areas such as copyright, patent research, and data management. These consultations allow students to benefit from the depth of knowledge across UMD Libraries while allowing librarians to engage with the program flexibly. Others participate as reviewers and judges for the University Libraries Award for Outstanding Gemstone Team, evaluating research essays and presentations. This role extends librarian involvement to those who may not have direct mentoring relationships but still wish to support undergraduate research excellence.

By providing multiple levels of engagement, Gemstone fosters a dynamic partnership between students and librarians, ensuring that research teams receive sustained, high-quality support while allowing librarians to participate in ways that match their expertise and availability.

Methodology

This study employs Qualitative Content Analysis (QCA) as the primary research method. QCA is a systematic approach to analyzing verbal, written, or visual communication and can be applied to both qualitative and quantitative data (Elo & Kyngäs, 2008). The goal of QCA is to provide a concise yet comprehensive description of the research phenomenon by organizing findings into conceptual categories that aid in understanding. In this study, QCA enables an in-depth exploration of student perceptions and experiences, particularly regarding their engagement with the library within a competitive, research-intensive academic environment.

This study follows a deductive approach, beginning with an established theoretical framework to identify relevant themes. However, it also incorporates an inductive dimension, allowing for emergent insights beyond pre-existing theoretical constructs. As Kuckartz & Rädiker (2023) suggest, category and code development in QCA exists on a spectrum from theoretical to empirical, enabling researchers to move fluidly between deductive and inductive orientations.

Following Elo & Kyngäs (2008), QCA consists of three phases: preparation, organization, and reporting.

The preparation phase begins with selecting the unit of analysis, which defines the fundamental unit of meaning within the dataset. In this study, each Gemstone team that contributed an essay in application for an undergraduate library research award

serves as the unit of analysis, as their collective responses reflect shared experiences rather than individual perspectives. This approach aligns with the study's goal of examining student engagement within a structured, team-based research program.

Mertens (2008) emphasizes that a research sample should be representative of the population from which it is drawn. While qualitative research does not seek generalizability, it is essential that findings authentically reflect the research population and that inferences are appropriately grounded in the data. This study examines student responses collected over the past ten years (2015–2024) to capture the experiences of high-achieving students in a competitive research environment. This timeframe ensures that the analysis reflects sustained trends rather than isolated occurrences.

During this preparation phase, researchers familiarize themselves with the dataset, establish connections to existing research, and prepare for systematic content analysis.

As researchers, we recognize that our identities, professional backgrounds, and perspectives shape our approach to this study. We are three white, cisgender, straight women-identifying librarians with professional expertise ranging from 5 to 15 years in academic librarianship, particularly in public services and instruction. Each of us has worked closely with the Gemstone program and its students, shaping our understanding of the program's structure and student experiences. Our commitment to undergraduate engagement and reciprocity in teaching and learning frames our analysis; we view students not merely as recipients of knowledge but as collaborators whose insights meaningfully inform our practice. We approach this research with a student-centered, asset-based perspective, recognizing and valuing students' contributions while also advocating for inclusive educational programs that support both student success and the professional well-being of librarians.

The second and most significant phase, content analysis, involves systematically exploring and organizing the data into meaningful categories. This study employs a deductive-inductive hybrid approach, meaning it begins with established theoretical constructs - drawn from research on High-Impact Practices (HIPs) and student belonging - while also remaining attentive to emergent themes within the data. To facilitate analysis, we developed an unconstrained matrix, which establishes high-level categories while maintaining flexibility in category formation (Elo & Kyngäs, 2008). We established two primary categories, *belonging* and *library resources/ support*, which were used as search aids to initiate and guide the coding process. These categories provided an entry point for identifying relevant content.

The second stage of analysis employed an inductive approach, refining parent categories into subcategories based on the material assigned to each category. This strategy allowed for deeper insights into student experiences beyond the initial theoretical framework. By integrating both deductive and inductive approaches, this study captures both predefined patterns of student engagement and emergent themes that offer new perspectives on student-library interactions.

The final phase of QCA involves synthesizing and presenting findings in a manner that is theoretically grounded and empirically substantiated. The results of this study aim to contribute to the growing body of research on student belonging, high-impact practices, and library engagement, offering both theoretical insights and practical implications for academic libraries seeking to enhance student success. The findings, presented in the next section, illustrate the key themes that emerged from the analysis, demonstrating how students articulate their experiences with library spaces, research support, and academic identity formation within a competitive research environment.

Data Collection and Scope

This study analyzes student responses collected from 2015 to 2024 as a part of an annual undergraduate research contest. Each year, Gemstone teams were asked to submit a reflective essay (ranging from 400 to 650 words) responding to a prompt that, while it varied slightly across each year, consistently asked them to "discuss the role that library roles and resources played in advancing your understanding of the research process, including guidance received from a librarian." Submissions were evaluated based on criteria that assessed students' ability to:

- Find and evaluate appropriate scholarly resources,
- Integrate scholarly resources into their research proposals,
- Connect their research to prior and future scholarship,
- Consult with their assigned librarian,
- Demonstrate the use of UMD's research databases and subject-specific resources,
- Conduct research ethically and with integrity,
- Articulate the potential impact of their proposed research within their discipline and in broader societal contexts.

The dataset consists of 90 essays, collaboratively authored by student research teams over a ten-year period. To protect confidentiality, any references to individual students or librarians were anonymized before analysis.

In consultation with the UMD Institutional Review Board (IRB) office, this study was determined not to require approval. The submitted essays were provided with the explicit understanding that they would be analyzed and evaluated as part of the contest. Additionally, as no identifying information was collected and all findings were reported in anonymized form, the study posed no potential risk or harm to participants, further confirming its exemption from IRB oversight. However, this study is grounded in a student-oriented approach to research, prioritizing ethical

data handling and participant confidentiality. To ensure the trustworthiness of our findings, we took the following measures:

- Anonymization: All data were anonymized, removing references to individual students and librarians.
- Secure Data Storage: Research materials were stored in a password-protected folder, accessible only to the research team.
- Risk Management: If any findings posed a potential risk to students or library staff members, they were excluded, even when their inclusion would have strengthened the study.

By employing these safeguards, we ensured that our study maintained ethical integrity, transparency, and respect for student experiences while generating meaningful insights into library engagement and research practices.

FINDINGS

To better understand how students perceive the library's role in their academic success, we systematically analyzed team essays. Given the length and complexity of responses, we segmented complete thoughts into discrete units and coded them accordingly. The first layer of coding categorized responses into two overarching themes: one centered on the institutional support that the library provided, including access to spaces, research materials, and services; the other reflecting an affective dimension, in which students articulated feelings of belonging, value, support, and appreciation for their librarian mentors. This categorization aligns with research on the sense of belonging in higher education, which emphasizes that students' connection to an institution is shaped by both structural factors, such as access to academic resources, and relational factors that foster inclusion, trust, and engagement (Dias-Broens et al., 2024).

In the sections that follow, we explore how librarians contributed to students' sense of belonging, academic identity, and research development through three core dimensions of engagement:

1. **Institutional Engagement:** How librarians guided students in navigating institutional resources, academic research enterprise systems, and professional networks.
2. **Intellectual Engagement:** How librarians contributed to students' understanding of research as an iterative and evolving process and strengthened student's research products through their disciplinary and professional expertise.

3. **Relational Engagement:** How librarians served as mentors and collaborators, creating a sense of connection, legitimacy, and trust.

Dimension 1: Institutional Engagement

While students often began their research with a narrow understanding of the library, their engagement with librarian mentors transformed their perception of the library into a dynamic intellectual and institutional partner. Beyond their relational and intellectual support, librarians also served as institutional guides, helping students navigate complex research infrastructures, access specialized services, and integrate into broader scholarly communities. Librarians played a crucial role in leveraging their social capital, connecting students with institutional resources that might have otherwise felt inaccessible.

By facilitating these connections, librarians not only empowered students to access institutional resources but also taught them how to use them effectively and with confidence. Their guidance demystified academic infrastructures, allowing students to see themselves as legitimate participants in the university's research landscape. Through this process, students developed a deeper understanding of how to leverage library services, navigate research spaces, and engage with scholarly resources, reinforcing their sense of belonging in the academic community.

Librarians as Institutional Navigators

Librarian mentors provided students with an expanded understanding of the university, positioning academic libraries as integral parts of the broader higher education ecosystem. Prior research suggests that while students are frequently exposed to librarians in their elementary education, proximity to librarians decreases as they progress in their education. As a result, undergraduates often struggle to recognize the role of academic librarians and understand how librarians can support their success (Fagan et al., 2022; Jameson et al., 2019). However, team reflections indicate that librarian mentors actively disrupted these patterns, integrating students into advanced research networks and introducing them to institutional resources typically reserved for graduate students and faculty.

Many teams described how their librarian mentors introduced them to previously unexplored library spaces and services. Several teams highlighted the library makerspace and Geographic Information System (GIS) lab as valuable resources they discovered through their mentor's guidance. One team noted that their librarian mentor "allowed" them access to a particular library space, suggesting that they viewed their mentor as instrumental in facilitating their inclusion. Others expressed appreciation for being encouraged to utilize services such as interlibrary loan,

research workshops, open scholarship support, and citation management tools, resources that are often marketed to graduate students and faculty researchers and, as a result, perceived to be off-limits to undergraduate researchers.

Beyond connecting students to library resources, librarians also acted as institutional navigators, leveraging their social capital to connect teams with both disciplinary and process-oriented expertise. Many teams described how their librarians introduced them to specialists in copyright, GIS, statistical analysis, citation management, information literacy, IRB processes and approvals, and patents. One team recounted how their librarian mentor connected them with an external researcher in their field, who reviewed their proposal and provided recommendations to strengthen their project. These connections often extended beyond the university, as librarians tapped into their broader professional networks, introducing students to external researchers and specialists.

While prior research has suggested that undergraduates often struggle to engage with academic librarians, these findings suggest that librarian mentors played an active role in socializing students into professional research communities. The sustained, deep integration with librarians in a mentorship capacity not only facilitated increased understanding and utilization of the library but also enhanced students' ability to navigate the broader research landscape.

Librarians as Co-Curricular Advisors

In addition to their disciplinary expertise and mentorship in research, librarians played an essential role as co-curricular advisors, helping teams navigate institutional processes and research logistics. This advisory role was particularly pronounced at the stage in which these essays were collected. At this point in the Gemstone program, students were early in their student-led research process, which differs significantly from course-based research projects, which are time-bound and supported by structured frameworks such as assigned readings and faculty-led instruction. As Stamatoplos (2009) emphasizes, student-led research is not about fulfilling course requirements but about contributing to knowledge production and dissemination. As a result, the role of the librarian mentor early in the research process was highly significant.

Teams frequently highlighted the importance of librarian feedback. While Gemstone staff provided logistical guidance and faculty mentors shaped research direction, students reported that librarians played a critical role in supporting the mechanics of the research itself. Teams often referred to their librarian mentor as "critical" and "crucial" to their team's success. One of the most frequently mentioned forms of librarian support was detailed feedback on literature reviews, research proposals, and presentations. Students described receiving feedback not only on content and

organization but also on scientific writing conventions, grammar, and clarity. One team shared how their librarian "provided grammatical suggestions that allowed us to communicate our information more concisely." This type of support was particularly significant to students because it existed in a space that was not fully addressed by their faculty mentors, Gemstone program directors, or co-curricular services such as the writing center. Librarians provided judgment-free, process-oriented support that met students at the point of need. This was crucial not only for producing high-quality proposals but also for building the confidence necessary to engage in student-led research, a process that lacks the structured infrastructure of a course-based project.

Library Resources and Services

Team essays also highlighted the resources and services provided by the library itself, revealing shifts in how students articulated their library experiences over time. Essays collected before 2020 tended to emphasize the accessibility of library resources, such as study rooms and group meeting spaces. In contrast, those collected during and after the COVID-19 pandemic increasingly focused on the role of librarians in facilitating connections to research experts and helping students navigate institutional infrastructures. This shift aligns with broader findings on the evolving role of academic libraries in a post-COVID-19 world, where digital resources and the expertise of library staff are viewed as equally important as the physical library space.

While students valued their librarian mentors' guidance in navigating library services, they also emphasized that the resources themselves were vital to their success in the research process. Students consistently described library databases as critical to advancing their research, particularly in locating peer-reviewed sources and accessing discipline-specific materials. Many highlighted how their librarian mentor introduced them to specialized databases such as PubMed, Web of Science, and IEEE, ensuring that they worked with scholarly, reputable, and relevant sources.

Beyond access to academic literature, students frequently cited the importance of research tools and support services. They described how the library facilitated their use of citation and data management software, which helped them organize and streamline their research process. Additionally, many teams pointed to interlibrary loan as an essential service that enabled them to acquire specialized materials that would have otherwise been difficult to obtain. In these reflections, students acknowledged not only the value of individual resources but also the library's broader role in ensuring equitable access to the tools necessary for their academic success.

Dimension 2: Intellectual Engagement

Academic libraries offer more than collections; they are dynamic intellectual spaces where students engage in inquiry, develop research competencies, and refine their academic identities. Librarians play a crucial role in this process, not only by providing access to scholarly materials but also by guiding students through the complexities of research. Research is not a linear process but an evolving exploration that requires persistence, adaptability, and critical thinking. Librarians act as intellectual partners in this journey, helping students navigate the uncertainty and discovery that define scholarly inquiry.

Within the Gemstone program, librarian mentors provide research support that extends far beyond transactional assistance. Unlike academic faculty, whose guidance is often discipline-specific and evaluative, librarians offer a broader, process-oriented perspective that encourages students to approach research with flexibility, intellectual curiosity, and a critical lens. This aligns with scholarship positioning library and information science as a meta-discipline, akin to education, that operates independently of specific academic fields, enabling users to understand, apply, extend, and disseminate knowledge across disciplines (Bates, 1999). Librarian mentorship takes multiple forms, from helping students conceptualize and refine research questions to offering disciplinary expertise. Through this multifaceted support, librarians reinforce students' identities as researchers, empowering them to engage in scholarly discourse with confidence and agency.

Librarians as Experts in the Iterative Research Process

Many teams emphasized that their librarian mentors provided more than access to resources; they offered holistic guidance on the research process itself. While faculty mentors contributed subject-specific expertise, librarians brought a distinct perspective as specialists in research methodology, helping students navigate its complex and nonlinear nature. One team reflected, "More than anything, though, [our librarian] taught us to be good researchers," highlighting the librarian's role in developing students' broader research competencies rather than simply directing them to sources.

A recurring theme across the essays was students' growing recognition that research is an iterative process. This reflects the "Research as Inquiry" frame from the ACRL *Framework for Information Literacy in Higher Education* (2016), which emphasizes that research requires persistence, flexibility, and strategic thinking. Rather than simply directing teams to sources, librarian mentors helped them embrace the dynamic nature of scholarly research, fostering deeper intellectual engagement. Many described how their librarians helped them refine ideas, adjust

approaches, and navigate challenges, particularly when encountering obstacles in their literature reviews. One team recalled panicking after realizing their initial topic was not feasible, but their librarian mentor's calm and flexible approach helped them pivot to a more viable direction. By modeling adaptability and problem-solving, librarians reinforced students' resilience, strengthened their confidence as emerging researchers, and encouraged intellectual persistence.

Librarians as Experts in Source Evaluation and Information Literacy

While students often began their research projects with a basic understanding of the research process, they frequently struggled to evaluate source credibility, differentiate between legitimate and unreliable sources, and interpret external markers of credibility, such as citation metrics. Many quickly reached the limits of their existing skills and required librarian guidance to refine their research strategies. Gemstone librarians played a critical role in enhancing students' ability to engage critically with information, a skill that became increasingly relevant in responses collected during and after the COVID-19 pandemic, when information overload and credibility concerns intensified. Several teams noted that their librarian mentor helped them recognize the limitations of preprint repositories and freely available online resources, while others described being encouraged to diversify their sources to ensure a balanced and well-rounded literature review.

Responses from teams indicated that librarian mentors empowered them to analyze scholarly impact, track citations, and assess credibility, reinforcing the idea that research involves interpreting and contextualizing knowledge rather than simply accumulating references. Many teams reflected on how their librarians helped them think beyond the most obvious sources and consider disciplinary perspectives, publication bias, and knowledge production in shaping scholarly conversations. The emphasis on source evaluation, citation tracking, and credibility assessment suggests that students emerged from these experiences with a significantly stronger foundation in scholarly inquiry than when they began.

Librarians as Experts in Disciplinary Knowledge

In addition to their expertise in research methodology and information literacy, teams recognized that their librarian mentors provided valuable disciplinary insights informed by their own scholarship and professional experience. In some cases, this expertise stemmed directly from a librarian's professional appointment, such as an engineering or agriculture subject liaison partnering with a team in that field. In other instances, students described librarians as subject-matter experts based on

their professional credentials, citing examples of librarians with backgrounds as firefighters and drone pilots.

Other teams highlighted how even when their librarian mentor did not hold disciplinary expertise in their research topic, they were still able to provide meaningful intellectual contributions by offering an outside perspective. One team described how a history librarian's insights reshaped their topic model by providing crucial historical context. Another reflected on how two librarians whose work engaged feminist theory influenced their attention to gender bias and strengthened their critical citation practices. These examples underscore how librarians' disciplinary expertise extends beyond resource knowledge to include theoretical and intellectual contributions that shape students' understanding of their topic, industry, and research process.

Dimension 3: Relational Engagement

Libraries serve as a "third space," or a setting that bridges the personal and the professional (Oldenburg, 1989). In the university context, academic libraries act as a neutral and collaborative environment, distinct from both residential and classroom spaces, where students can explore ideas, engage in inquiry, and receive guidance. Elmborg (2011) extends this concept beyond physical space, arguing that academic librarians disrupt traditional faculty-student power structures by fostering student-centered learning interactions that prioritize exploration, curiosity, and intellectual development.

Within the Gemstone program, librarian mentors occupy a distinct relational role, positioned between the team's faculty mentor and the program directors. Unlike faculty, who formally assess student work, librarians serve as co-learners, mentors, and research partners, a dynamic that empowers students to take intellectual risks, refine their scholarly identity, and develop confidence as emerging researchers.

Time as Currency in the Academic Institution

One of the most striking themes across team reflections was the emphasis on time, both in terms of the hours librarians invested in supporting research and their availability and responsiveness to student needs. Within a neoliberal university model, time is often commodified and weaponized, favoring efficiency over depth (Clegg, 2010). Nicholson, Pagowsky, and Seale (2019) argue that academic libraries frequently operate under a "just-in-time" service model, which prioritizes transactional efficiency over sustained engagement. Gemstone librarians actively

resist this model, choosing instead to invest in long-term, flexible relationships that foster deeper intellectual engagement and trust.

Students frequently contrasted their interactions with librarians with the transactional nature of faculty and university support services. Many noted that while office hours with faculty were restricted to rigid schedules, their librarian mentor was consistently available, attending team meetings, proposal presentations, and even evening or weekend program events. This investment of time was more than just a display of availability; it symbolized a commitment to students as legitimate members of the academic community. In an educational environment where time is often restricted and commodified, students viewed librarians' sustained engagement as a signal that their research was valued and worthy of deep attention. Unlike interactions with faculty, which often felt structured around deliverables or assessments, students saw their librarian mentor as someone who was invested in their success for its own sake.

Disrupting Power Dynamics Through Collaboration

Librarians occupy a unique position in academia—neither faculty nor administrative staff—which allows them to serve as collaborators rather than gatekeepers in the research process. While faculty mentors were often perceived as disciplinary authorities with evaluative power over students' work, librarians played a fundamentally different role, one defined by approachability, open-mindedness, and accessibility. Many teams described their librarian mentor as an intellectual ally, someone who provided judgment-free guidance and encouragement as they navigated the complexities of their research. One team reflected, "The most valuable resource the library has provided is the assistance of the librarians themselves."

Unlike faculty and program directors, whose busy and rigid schedules often limited their availability, librarians were seen as more accessible and flexible, willing to meet students at different stages of their research journey and provide personalized support tailored to their evolving needs. This approach not only helped students refine their research questions and methodologies but also modeled a collaborative and iterative way of thinking about inquiry itself. Rather than prescribing rigid research directions, librarians encouraged exploration, iteration, and intellectual risk-taking, reinforcing the idea that research is a dynamic process shaped by curiosity, adaptability, and critical engagement. By allowing students to experiment, adjust, and refine their work without fear of judgment, librarians strengthened their confidence and ownership over their research, helping them see themselves as active participants in scholarly conversations rather than passive recipients of knowledge.

Feeling Seen, Supported, and Valued

Perhaps the most emotionally resonant theme in student reflections was the extent to which librarians made them feel seen, heard, and valued. In a large university where students often experience anonymity and isolation, personal relationships with librarians provide a critical counterbalance, offering students a sense of recognition and belonging within the academic community. One team wrote, "Not only has [our librarian] provided unwavering support in our questions and research, but she has educated us extensively on reading and digesting scholarly materials." Another reflected, "We have been able to form a close relationship with [our librarian]… she attended our meetings to understand how we work and was able to recommend valuable resources for our team." These relationships extended far beyond transactional research support; librarians became mentors who provided emotional scaffolding, validation, and confidence-building guidance throughout students' academic journeys.

Teams frequently described their librarian mentor as a grounding presence, someone who helped them navigate stress, self-doubt, and the intellectual challenges of long-term research projects. Whether assisting students through unexpected research obstacles, helping them refine their ideas, or simply offering reassurance during moments of uncertainty, librarians played an essential role in reinforcing students' confidence and persistence. By fostering these meaningful connections, librarians not only supported students' academic success but also strengthened their sense of belonging within the university, ensuring they felt recognized, valued, and empowered in their research process.

Reciprocal Sense of Belonging for Librarians

While this study primarily focuses on student experiences, anecdotal feedback from librarians who have served as mentors reinforces these findings. Many librarians shared that their involvement with Gemstone teams provided them with a deeper sense of connection to students and the research process. For some, particularly those in traditionally non-student-facing roles, this mentorship was an opportunity to engage more directly with undergraduates and support their intellectual growth. Others noted that witnessing students evolve into confident researchers was deeply fulfilling, as, over their time as mentors to a team, they saw students transition from novice scholars to active contributors in their fields. One librarian mentions feeling a "sense of pride" mentoring a Gemstone team progressing through the research process.

A defining characteristic of librarian involvement in Gemstone is that all participation is voluntary. Librarians choose to engage because they are personally invested in the work, not because they are assigned to it. This voluntary nature fosters genuine

enthusiasm and commitment, as librarians dedicate their time and expertise because they want to be part of the program. Whether serving as long-term mentors, offering specialized consultations, or evaluating research award submissions, librarians participate in ways that align with their interests, expertise, and availability. This flexibility ensures that their engagement is not just an obligation but a meaningful professional experience.

Librarians also highlighted how their work with Gemstone teams expanded their own perspectives. Some described how interdisciplinary collaboration with students encouraged them to think more creatively about research assistance, while others found inspiration in students' enthusiasm, curiosity, and problem-solving approaches. One librarian noted that working with student teams was "restorative," providing a meaningful contrast to the administrative and technical challenges of their regular duties. Another shared that the long-term nature of the Gemstone program allowed them to build rewarding relationships, seeing students through the entire research process from idea formation to final thesis defense.

The benefits of librarian-student mentorship are not one-sided; rather, they create a reciprocal dynamic where both students and librarians experience a greater sense of purpose, engagement, and intellectual community. Interestingly, even librarians who participated in lower tiers of engagement, such as reviewers for research awards or one-time consultants, reported finding a sense of meaning and joy in their work. Their involvement, though brief, allowed them to witness student learning in action and contribute to undergraduate research excellence in a way that enhanced their own professional satisfaction and growth.

By fostering voluntary, flexible, and meaningful participation, Gemstone offers a model for how academic libraries can engage faculty and staff in research mentorship in a way that benefits all parties. This reciprocal structure reinforces the idea that mentorship is not just about guiding students; it is also about cultivating a shared academic community where both mentors and mentees grow.

DISCUSSION

This study explored the question, "How do team-based essays submitted for an undergraduate library research award characterize the role of the library, its resources, and librarian mentorship around research in a student-led research program?" Findings indicate that students consistently positioned the library not as a passive resource but as an active partner in their research experience. In their team essays, students expressed gratitude for the comprehensive support provided by their librarian mentors, who guided them through all stages of the research process, from developing and refining research questions to crafting well-structured scholarly proposals. Many

teams reflected on the mentorship aspect of their interactions, noting how librarians helped them connect with subject specialists who could provide targeted support, such as copyright guidance, patent research, and specialized disciplinary resources. Librarians also played a key role in refining research questions and ensuring that students' methodologies were grounded in empirical research.

Beyond research guidance, students described their librarian mentors as trusted collaborators, emphasizing their approachability, responsiveness, and investment in student success. Through sustained engagement, librarians became more than research guides; they fostered confidence, intellectual curiosity, and self-efficacy, ensuring that students felt supported and empowered throughout their research journey.

These findings contribute to the broader literature on High-Impact Practices (HIPs) by demonstrating the essential role of academic librarians in undergraduate research experiences. Undergraduate research has been widely recognized as a key HIP, offering students opportunities for deep learning, faculty engagement, and professional skill-building. However, much of the research on HIPs has focused on faculty mentorship, with little attention paid to how relationships with librarians shape students' engagement in these practices.

This study suggests that librarians provide an important, often overlooked form of mentorship within HIPs, particularly in Living-Learning Programs (LLPs) with an undergraduate research focus. Students in Gemstone described their librarian mentor as an intellectual and institutional guide, helping them develop research competencies, refine their methodologies, and build confidence in their academic abilities. Unlike faculty mentors, whose guidance tended to be disciplinary and evaluative, librarians provided judgment-free, process-oriented mentorship that allowed students to experiment, iterate, and develop scholarly identities.

These findings reinforce the idea that mentorship is a critical component of HIPs and that librarians should be recognized as key mentors within these initiatives. Librarians' engagement with students extended beyond research guidance to include professional development, information literacy, and ethical research practices, making their role in undergraduate research programs particularly impactful.

These findings also contribute to existing scholarship on student belonging in academic libraries. Prior research has largely examined belonging in terms of physical spaces and access to resources, but this study suggests that librarian mentorship itself fosters belonging within the research process. This is particularly important in LLPs, which offer unique academic and social structures that shape students' experiences. While LLPs have been studied extensively for their role in fostering community and academic integration, little attention has been paid to how librarian mentorship within LLPs contributes to students' sense of belonging in research environments.

The findings from this study suggest that librarian mentorship fosters belonging in two key ways:

1. Providing a **consistent and reliable support system** throughout students' research journeys. Team essays indicated that librarian mentors filled a critical mentorship gap, offering iterative feedback and sustained engagement that helped students feel supported and recognized as emerging scholars.
2. **Legitimizing students' place within the research community**. By treating students as capable researchers, guiding them through academic challenges, and connecting them with institutional resources, librarian mentors reinforced students' identities as legitimate contributors to scholarly discourse.

These findings indicate that librarian mentorship should be viewed as a fundamental component of student-led research experiences in LLPs and that further integration of librarians into LLPs could enhance student belonging and engagement in research.

Recommendations for Future Research

Findings from this study suggest multiple avenues for further research that could deepen our understanding of academic libraries' role in student-led research and institutional belonging.

This study captured student reflections in the second semester of their second year, at a pivotal moment when students were transitioning into independent research. However, students' relationships with their librarian mentors and the library itself may evolve over time. Future research could take a longitudinal approach, examining how students' engagement with librarians, library resources, and institutional infrastructures changes as they progress through their research experience.

Much of the literature on library engagement focuses on First-Year Experience (FYE) programs, including positions dedicated to supporting first-year students (Angell, 2018). However, there is less emphasis on the Second-Year Experience (SYE), even though students in their second year may still exhibit novice knowledge of research and library services.

This study suggests that even after a full year on campus in a program that actively engaged with the library, students remained unfamiliar with the depth of research support available to them. Future studies could explore how second-year students interact with library services and how this engagement contributes to their identity as researchers.

As the only four-year living-learning program (LLP) at UMD, Gemstone is distinct from most LLPs, which last one to two years. This structure likely contributes to students' extended engagement with librarian mentors. A comparative study examining research engagement across two-year and four-year LLPs could provide insight into how academic libraries can best collaborate with LLPs to support undergraduate research.

Although this study focused on students' sense of belonging, an emerging question is how librarians themselves experience a sense of belonging within campus research initiatives. Anecdotal evidence from librarians involved in Gemstone suggests that mentorship fosters a sense of professional fulfillment and deeper institutional integration. Future research could explore how mentorship programs contribute to librarians' professional identity, engagement, and visibility within the university.

CONCLUSION

This chapter highlights the multifaceted role of academic librarians in student-led research, demonstrating that their contributions extend far beyond providing resources. Librarians serve as mentors, institutional navigators, and intellectual collaborators, shaping how students approach research, engage with information, and develop confidence in their scholarly identities. Through relational, intellectual, and institutional engagement, librarians provide essential support that bridges gaps in traditional faculty and programmatic guidance, particularly in student-led HIPs, such as undergraduate research programs.

Findings from this study suggest that students in the Gemstone program consistently positioned librarians as integral to their academic development. Librarians helped students refine research questions, develop methodological approaches, and connect with disciplinary and institutional experts. Beyond research guidance, librarians played a vital role in fostering students' sense of belonging, reinforcing their legitimacy as researchers and their ability to navigate complex academic infrastructures with confidence.

These insights contribute to broader discussions on the role of libraries in HIPs and LLPs, underscoring the importance of embedding librarians into undergraduate research experiences. By serving as accessible and responsive mentors, librarians filled critical gaps in research support, writing development, and institutional navigation, areas that were not fully addressed by faculty mentors or co-curricular academic services.

As universities continue to expand undergraduate research opportunities, the findings from this study emphasize the need for academic libraries to be recognized as essential partners in student-led research. Librarian mentorship should not be viewed as peripheral but as a fundamental component of research infrastructure, ensuring that students—particularly those in LLPs and other HIPs—receive the sustained, process-oriented support necessary to engage in meaningful, high-quality research.

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KEY TERMS AND DEFINITIONS

Academic libraries: libraries found on a college or university campus. Academic libraries provide research support and a public space to the students, faculty, staff, and outside researchers.

High-impact practices: sustained educational practices which increase student engagement. Examples include undergraduate research, living-learning programs, and service learning.

Living-learning programs / communities: organized programs or communities for undergraduate students centered around a shared academic goal.

Mentorship: guidance by an experienced professional giving advice in completing a task. Mentorship can be long-term or short-term and informal or formal.

Qualitative Content Analysis (QCA): a research methodology to analyze written responses, following three stages: preparation, organization, and reporting.

Second-Year students: undergraduate students in their sophomore year of study at a college or university; also known as a sophomore student.

Sense of belonging: the feeling of acceptance in a space.

Student-led research: academic research that is directed by students and is not affiliated with an assignment for a curricular course.